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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,537	07/03/2003	Alastair D. McAulay	1344-PA237	4526

27189 7590 09/22/2004

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EXAMINER	
JUBA JR, JOHN	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/613,537	MCAULAY, ALASTAIR D.	
	Examiner	Art Unit	
	John Juba, Jr.	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Objections

Claim 1 is objected to because of the following informalities. Appropriate correction is required:

In the fourth line of claim 1, the semicolon (;) should be removed or replaced with a comma (,).

In the ninth line of claim 1, "sighal" should read "signal".

In the tenth line of claim 1, "amplifiier" should read "amplifier".

Claim Rejections - 35 USC § 112

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is ambiguous and confusing (in the last two lines) as to whether the NOR operation is performed on the first and second input of the first coupler, on the first and second input of the second coupler, or on the first input of one of the couplers and the second input of the other coupler. For the purposes of examination, the claim has been construed as requiring the NOR operation to be performed on the first and second *signals*.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao, et al (*CLEO '99*), in view of Nesset, et al (U.S. Patent number 5,987,040). Zhao, et al disclose an optical logic gate comprising

a first (cw) light source having an optical output having a first wavelength (1550 nm);

a structure having a first optical input receiving a first optical signal (A) and a second input receiving a second optical input (B) [Zhao clearly describe "lights" A and B as separate logic inputs],

the structure receiving said output of said first (cw) light source and some combination of the first and second inputs; and

a [two-stage] multiple quantum well semiconductor optical amplifier receiving some combination of the first (cw) light source and the two optical signals (A and B) and generating an optical signal (C) that is the logical NOR of the first and second optical signals.

Thus, Zhao, et al disclose the invention substantially as claimed. However, Zhao, et al do not particularly disclose the first light source as a laser light source, and do not disclose the first and second couplers arranged as recited.

In the same field of endeavor, Nesset, et al disclose an all-optical AND gate comprising a laser light source (130), first and second logical inputs (A)(B), first and second couplers (131)(132), and a multiple quantum well semiconductor optical amplifier. In the teachings of Nesset, et al, one of ordinary skill would have recognized the first and second optical couplers (131)(132) as a convenient means of combining signals to be applied to the SOA in a single integrated package, while at the same time permitting integrated monitoring of the applied power levels. The laser would have been recognized as a readily regulated source of wavelength stable input power.

It would have been obvious to one of ordinary skill to use employ first and second couplers in the NOR gate of Zhao, et al in the interest of providing convenient means of combining the input signals to be injected into the amplifier, as suggested by Nesset, et al. One of ordinary skill would have recognized the many advantages offered by integration of such couplers into the same package with power monitors and the optical amplifier, such as reduced size, and reliable interconnections free from the instability and susceptibility of free-space optics to contamination. The requisite arrangement of

the first and second combiners to provide a portion of the first and second input signals and a third optical signal would have been readily apparent to the artisan in operating the semiconductor amplifier in the mode taught by Zhao, et al. With regard to the provision of laser light source, Zhao, et al themselves use a laser source for characterizing the gain recovery time of the amplifier. Thus, in light of the teachings of Zhao, et al and Nesset, et al, it is believed that one of ordinary skill to use a laser as the cw light source of Zhao, et al in the interest of providing an easily regulated wavelength stable source of input power, as fairly suggested by both references.

Conclusion

The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

Romaniuk (U.S. Patent Appl. Pub. No. 2003/0179425 A1) discloses an all-optical gate comprising first and second combiners, the gate can be connected to yield a logic NOR of first and second inputs.

Kim, et al (U.S. Patent Appl. Pub. No. 2003/0058527 A1) disclose semiconductor optical amplifiers (SOA's) connected in a logical gate using cross gain modulation.

Song (U.S. Patent number 6,778,303) discloses an all-optical NOR gate using semiconductor optical amplifiers.

Chu, et al (U.S. Patent number 6,522,462) disclose an all-optical NOR gate with combiners and SOA's, some of the SOA's being operated for power management in the disclosed MZI gate configuration.

Maywar,. et al (U.S. Patent number 6,456,417) disclose an all-optical flip-flop using a multiple quantum well SOA (DFB laser diode operated below the lasing threshold.)

Byun, et al (U.S. Patent number 6,424,438) disclose an all-optical NOR gate using SOA's.

Roberts, et al (U.S. Patent number 5,999,283) describe the configuration for an all-optical NOR gate using SOA's.

Toshio Ito, et al (*IEEE Phot. Tech. Lett.*) describe an MQW-SOA as having large fabrication tolerance, low polarization dependence, high switching rates, and a good noise figure when operated as an optical "gate".

D. Wolfson, et al (*IEEE Phot. Tech. Lett.*) explore different SOA's for optical gating.

J. Yao, et al (*IEE Coll.*) disclose optical switching arrangements employing MQW SOA's.

K.E. Stubkjaer (*IEEE Sel. Topics. Q.E.*) discusses cross gain modulation in optical gates employing SOA's.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (571) 272-2314. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Drew Dunn whose number is (571) 272-2312 and who can be reached on Mon.- Thu., 9 – 5.

The centralized fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for *all* communications.

JOHN JUBA, JR.
PRIMARY EXAMINER
Art Unit 2872

September 17, 2004